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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.
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09/728,244

12/01/00

BUCHOLZ

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EXAMINER

JOYCE, W

ART UNIT

PAPER NUMBER

3682

DATE MAILED:

10/25/01

Please find below and/or attached an Office communication concerning this application or proceeding.

Commissioner of Patents and Trademarks

Office Action Summary

Application No.

09/728,244

Applicant(s)

BUCHOLZ ET AL.

Examiner

William C. Joyce

Art Unit

3682

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 01 December 2000.
- 2a) ☐ This action is FINAL. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-44 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-44 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 16 May 2001 is/are: a) ☐ accepted or b) ☒ objected to by the Examiner.
- Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- 11) ☐ The proposed drawing correction filed on _____ is: a) ☐ approved b) ☐ disapproved by the Examiner.
- If approved, corrected drawings are required in reply to this Office action.
- 12) ☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. §§ 119 and 120

- 13) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.
- 14) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).
- a) ☐ The translation of the foreign language provisional application has been received.
- 15) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

Attachment(s)

- 1) ☐ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☒ Information Disclosure Statement(s) (PTO-1449) Paper No(s) 4.6.
- 4) ☐ Interview Summary (PTO-413) Paper No(s). _____
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other:

DETAILED ACTION

This is the first office action in response to the above identified patent application filed on December 1, 2000.

Information Disclosure Statement

1. The information disclosure statement filed 12/01/00 fails to comply with the provisions of 37 CFR 1.97, 1.98 and MPEP § 609 because each publication listed on the IDS must be identified by author (if any), title, relevant pages of the publication, date, and place of the publication. Examiner has amended the IDS to include the above noted information. The publications have been considered and a signed copy of the IDS is attached hereto.

Drawings

2. The corrected or substitute drawings were received on May 16, 2001. These drawings are approved.

3. The drawings are objected to under 37 CFR 1.83(a). The drawings must show every feature of the invention specified in the claims. Therefore, the worm gear having an "arcuate-formed flank surface (which) is convex relative to said tooth" (claim 29) must be shown or the feature(s) canceled from the claim(s). No new matter should be entered. Note the claim rejection under 35 USC 112, second paragraph below.

Claim Rejections - 35 USC § 112

4. The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

5. Claims 2-5, 7-21, 29, 32-37, 39 and 42-44 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

a. Claim 2, lines 1-4, the limitation "each or said teeth include a first flank surface and an opposing second flank surface, and wherein each of said teeth of said worm gear includes a first flank surface and an opposing second flank surface" is not fully understood. It appears that applicant intended to recite -- each or said teeth **of the worm** include a first flank surface and an opposing second flank surface, and wherein each of said teeth of said worm gear includes a first flank surface and an opposing second flank surface--.

b. Claims 7 and 16, lines 2-3, the limitation "about .5 degrees to 2.0 degrees" is unclear because of the relative term "about." For example, does a helix angle of 3.5 degrees meet the claim limitation?

c. Claims 11 and 20, line 2, the term "gear" (first occurrence) appears to be a typographical error which must be changed to --worm--.

d. Claim 29, the limitation "said at least one arcuately-formed flank surface is convex relative to said tooth" is unclear because it is understood that the worm gear is formed with concave arcuately-formed flank surfaces and not convex arcuately-formed flank surfaces (see Figure 5). More clearly, claim 29 depends

Art Unit: 3682

from claim 26 which defines a worm gear having two arcuately-formed flank surfaces which are configured to mesh with a worm. Appropriate correction is required. If applicant intends to define the worm as having convex flank surfaces, claim 26 must be amended to positively recite the worm.

e. Claim 32, line 2, the term "configurable" is not fully understood as to whether applicant intends to positively define the worm gear in double flank contact with a worm, or that the worm gear could be adapted to engage a worm with double flank contact.

f. Claim 37, line 2, the limitation "said helical thread" lacks proper antecedent basis.

g. Claim 39, lines 2-3, the terms "low" (three occurrences) is a relative term which fails to particularly point out and define the metes and bounds of the desired patent protection.

h. The limitations of claims 42-44 are not understood because they do not appear to contain method steps. A process for making is a claim type that defines the invention by a series of active method steps (e.g. providing, allowing, disposing) which explain how an apparatus is made.

Claim Rejections - 35 USC § 102

6. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

Art Unit: 3682

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

7. Claims 1-3, 8-12, 17-21, 38, 40-44 are rejected under 35 U.S.C. 102(b) as being anticipated by Visser (USP 3,122,938).

Visser discloses a worm gear drive in Figures 13-15 comprising a worm (100) having teeth which are in double mechanical flank communication with teeth of a worm gear (102). The worm gear is formed with a rigid hub portion (108) and a flexible web portion (106) for flexibly disposing a rigid tooth portion (104) to the hub portion. Referring to column 3, lines 67-70, Visser discloses that the "helix angle of the worm 100 and the helix angle of the gear 102 do not match, whereby the teeth of gear 102 are wedged by an interference fit into the worm 100."

8. Claims 26-31 are rejected under 35 U.S.C. 102(b) as being anticipated by Steiner (USP 2,669,128).

Steiner discloses a worm gear drive having a worm (41) meshing with a worm gear (47), the worm gear having at least one tooth with two arcuately formed flank surfaces configured to engage corresponding surfaces of a worm tooth, wherein the worm is adapted to run in double flank contact with the worm gear (see Figure 1).

9. Claims 32-37 are rejected under 35 U.S.C. 102(b) as being anticipated by Pickles (USP 2,760,381).

Pickles discloses a worm gear drive having a worm (18) meshing with a worm gear (19), wherein the teeth of the worm gear are flexible and the teeth of the worm are rigid.

The limitation "worm gear....*configurable* to engage in double flank contact with a worm" does not define over Pickles because the worm can be configured to moved towards to worm gear to reduce the backlash of the teeth such that the worm engages the worm gear in double flank contact. In order to overcome this rejection, examiner suggests that applicant positively recite the worm meshing with the worm gear in double flank contact.

Claim Rejections - 35 USC § 103

10. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

11. Claims 6, 7, 15, 16, 22-25, and 39 are rejected under 35 U.S.C. 103(a) as being unpatentable over Visser (USP 3,122,938).

Visser does not specifically disclose the specific helix angles of the worm and the worm gear (claims 6, 7, 15, 16, and 39), but discloses that the "helix angle of the worm 100 and the helix angle of the gear 102 do not match, whereby the teeth of gear 102 are wedged by an interference fit into the worm 100" (column 3, lines 67-70). It would have been obvious to one of ordinary skill in the art at the time the invention was made to set

Art Unit: 3682

the helix angle of the worm less than the helix angle of the worm gear by .5 to 2.0 degrees, since it has been held that where the general conditions of a claim are disclosed in the prior art, discovering the optimum or workable ranges involves only routine skill in the art. In re Aller, 105 USPQ 233.

Visser does not disclose the spring rate of the worm gear, but the flexible web portion inherently has a spring rate which increases as the load on the gear is increased. For example, in the event the worm gear arrangement of Visser is operated at maximum capacity, the web portion would be deformed such that its spring rate is higher as compared to the spring rate of the gear arrangement operating at a low capacity.

Allowable Subject Matter

12. Claims 4, 5, 13, and 14 would be allowable if rewritten to overcome the rejection(s) under 35 U.S.C. 112, second paragraph, set forth in this Office action and to include all of the limitations of the base claim and any intervening claims.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to William C. Joyce whose telephone number is (703) 305-5114. The examiner can normally be reached on Monday - Thursday 7:30-5:00.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, David Bucci can be reached on (703) 308-3668. The fax phone numbers

Application/Control Number: 09/728,244

Page 8

Art Unit: 3682

for the organization where this application or proceeding is assigned are (703) 305-7687 for regular communications and (703) 305-7687 for After Final communications.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is (703) 308-1113.

William C. Joyce 3682
William C. Joyce
October 24, 2001